

What is claimed is:

1. A high copper low alloy steel sheet made by the steps comprising:

(a) preparing a molten melt producing an as-cast low alloy steel

5 comprising

(i) by weight, between 0.02 % and 0.3% carbon, between 0.10% and 1.5% manganese, between 0.01% and 0.5% silicon, less than 0.04% sulfur, greater than 0.01 % and less than or equal to 0.15 % phosphorus, less than 0.05% aluminum, more than 0.20% copper, less than 0.03 % tin, and less than 0.10 %
10 nickel;

(ii) the remainder iron and impurities resulting from melting;

(b) solidifying and cooling the molten melt into a sheet less than 10 mm in thickness in a non-oxidizing atmosphere to below 1080 °C.

2. The high copper low alloy steel sheet as claimed in Claim 1 wherein

15 the corrosion index (I) is at least 6.0 where:

$$I = 26.01 (\% \text{ Cu}) + 3.88 (\% \text{ Ni}) + 1.20 (\% \text{ Cr}) + 1.49 (\% \text{ Si}) + 17.28 (\% \text{ P}) - 7.29 (\% \text{ Cu})(\% \text{ Ni}) - 9.10 (\% \text{ Ni})(\% \text{ P}) - 33.39 (\% \text{ Cu}).$$

3. The high copper low alloy steel sheet as claimed in Claim 1 wherein the total of the % by weight of copper is between 0.2 and 2.0.

20 4. The high copper low alloy steel sheet as claimed in Claim 1 wherein the thickness of the sheet is less than 5 mm in thickness.

5. The high copper low alloy steel sheet as claimed in Claim 1 wherein the thickness of the sheet is less than 2 mm in thickness.

6. A high copper low alloy steel sheet made by the steps comprising:

25 (a) preparing a molten melt producing an as-cast low alloy steel comprising

(i) by weight, between 0.02 % and 0.3% carbon, between 0.10% and 1.5% manganese, between 0.01% and 0.5% silicon, less than 0.04% sulfur, greater than 0.01 % and less than or equal to 0.15 % phosphorus, less than 0.05% aluminum, more than 0.20% copper , less than 0.03 % tin, and less than 0.10 %
30 % nickel;

(ii) The remainder iron and impurities resulting from melting;

(b) forming the melt into a casting pool supported on casting surfaces of a pair of cooled casting rolls having a nip therebetween;

(c) counter rotating the casting rolls to form a thin cast sheet of less than 10 mm in thickness extending downwardly from the nip; and

(d) cooling the cast sheet to below 1080 °C in a non-oxidizing atmosphere.

7. The high copper low alloy steel sheet as claimed in Claim 6 wherein the corrosion index (I) is at least 6.0 where:

$$I = 26.01 (\% \text{ Cu}) + 3.88 (\% \text{ Ni}) + 1.20 (\% \text{ Cr}) + 1.49 (\% \text{ Si}) + 17.28 (\% \text{ P}) - 7.29 (\% \text{ Cu})(\% \text{ Ni}) - 9.10 (\% \text{ Ni})(\% \text{ P}) - 33.39 (\% \text{ Cu}).$$

8. The high copper low alloy steel sheet as claimed in Claim 6 wherein the total of the percent by weight of copper is between 0.2 and 2.0.

9. The high copper low alloy steel sheet as claimed in Claim 6 wherein the thickness of the thin cast sheet is less than 5 mm in thickness.

10. The high copper low alloy steel sheet as claimed in Claim 6 wherein the thickness of the thin cast sheet is less than 2 mm in thickness.

11. A method of making a high copper low alloy steel sheet comprising the steps of:

(a) preparing a molten melt producing an as-cast low alloy steel comprising

(i) by weight, between 0.02 % and 0.3% carbon, between 0.10% and 1.5% manganese, between 0.01% and 0.5% silicon, less than 0.04% sulfur, greater than 0.01 % and less than or equal to 0.15 % phosphorus, less than 0.05% aluminum, more than 0.20% copper, less than 0.03 % tin, and less than 0.10 % nickel;

(ii) the remainder iron and impurities resulting from melting;

(b) solidifying the molten melt into sheet less than 10 mm in thickness in a non-oxidizing atmosphere to below 1080 °C.

12. The method of making a high copper low alloy steel sheet as claimed in Claim 11 wherein the corrosion index (I) is at least 6.0 where:

$$I = 26.01 (\% \text{ Cu}) + 3.88 (\% \text{ Ni}) + 1.20 (\% \text{ Cr}) + 1.49 (\% \text{ Si}) + 17.28 (\% \text{ P}) - 7.29 (\% \text{ Cu})(\% \text{ Ni}) - 9.10 (\% \text{ Ni})(\% \text{ P}) - 33.39 (\% \text{ Cu}).$$

13. The method of making a high copper low alloy steel sheet as claimed in Claim 11 wherein the total of the percent by weight of copper is between 0.2 and 2.0.

14. The method of making a high copper low alloy steel sheet as claimed
5 in Claim 11 wherein the thickness of the thin cast strip is less than 5 mm in thickness.

15. The method of making a high copper low alloy steel sheet as claimed in Claim 11 wherein the thickness of the thin cast strip is less than 2 mm in thickness.

10 16. A method of making a high copper low alloy steel sheet comprising the steps of:

(a) preparing a molten melt producing an as-cast low alloy steel comprising

(i) by weight, between 0.02 % and 0.3% carbon, between
15 0.10% and 1.5% manganese, between 0.01% and 0.5% silicon, less than 0.04% sulfur, greater than 0.01 % and less than or equal to 0.15 % phosphorus, less than 0.05% aluminum, more than 0.20% copper, less than 0.03 % tin, and less than 0.10 % nickel;

(ii) the remainder iron and impurities resulting from melting;

20 (b) forming the melt into a casting pool supported on casting surfaces of a pair of cooled casting rolls having a nip therebetween;

(c) counter rotating the casting rolls to form a thin cast sheet of less than 10 mm in thickness extending downwardly from the nip;

25 (d) cooling the cast sheet to below 1080 °C in a non-oxidizing atmosphere.

17. The method of making a high copper low alloy steel sheet as claimed in Claim 16 wherein the corrosion index (I) is at least 6.0 where:

$$I = 26.01 (\% \text{ Cu}) + 3.88 (\% \text{ Ni}) + 1.20 (\% \text{ Cr}) + 1.49 (\% \text{ Si}) + 17.28 (\% \text{ P}) - 7.29 (\% \text{ Cu})(\% \text{ Ni}) - 9.10 (\% \text{ Ni})(\% \text{ P}) - 33.39 (\% \text{ Cu}).$$

30 18. The method of making a high copper low alloy steel sheet as claimed in Claim 16 wherein the total of the percent by weight of copper is between 0.2 and 2.0.

19. The method of making a high copper low alloy steel sheet as claimed in Claim 16 wherein the thickness of the thin cast strip is less than 5 mm in thickness.

5 20. The method of making a high copper low alloy steel sheet as claimed in Claim 16 wherein the thickness of the thin cast strip is less than 2 mm in thickness.